Frankly Speaking

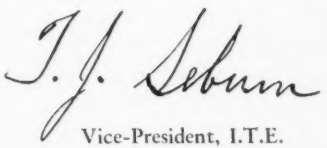
One For Every One Hundred

THERE has been much speculation during the past few months concerning the impact of increased air travel on the problem of street and highway transportation. This has, in many cases, been accompanied by too much loose talk to the general effect that the motor vehicle will be quick to follow the horse and buggy into virtual oblivion with the return of peace. In most cases such statements have not been accompanied by quantitative predictions of any sort.

Recently national aeronautics authorities have indicated that they expect about 300,000 aircraft of all types to be operating in the United States five years after the war, and we are advised that this figure is rather generally accepted by most of the informed air people. This means that in five years after hostilities cease there will only be one airplane in the United States for every hundred motor vehicles in use at the time of Pearl Harbor, or only one for every fifty motor vehicles on the streets and highways five years after the last war. Certainly this number will not materially affect the need for surface transportation.

Rather than minimizing the problems of Traffic Engineers, such a development of air travel will greatly increase the scope of our problems. The proper coordination of surface transportation with air travel is of extreme importance. Adequate and efficiently operated terminals must be provided, and proper access roads will be needed. With an increased emphasis on the time factors of travel, the speed and crowflight route of aircraft will place surface transportation under critical scrutiny. We cannot allow delays to make it necessary to spend as much time going a few city blocks as the airplane consumes in crossing a whole state.

There is one extremely significant feature for Traffic Engineers as we approach this problem. The meeting place of air travel and surface transportation must be at our level, where our past experience should prove of real value in study and solution of the problem.



Vice-President, I.T.E.

VOLUME XIV NOVEMBER, 1943 NUMBER 2

Planning a State System of Post-War Highways

AN excellent address on this subject was delivered by Wm. J. Cox, Commissioner of Highways, State of Connecticut, at the I.T.E. Annual Meeting. While Mr. Cox dealt with problems affecting his own state and their proposed solutions, many if not most of these same problems are found in all the other states. These can be virtually summed up as: (1), great needs, and (2), little money.

In the first place the state system was built piece by piece in scattered sections of the state over a period of many years. The result has been that few routes have uniformity in design, type, or road width.

Secondly, the older routes are now inadequate and outmoded. The automobile developed largely in the period between the two World Wars. In this relatively short period tremendous changes have taken place, first in traffic volumes, and second, in traffic speeds. Road design and construction have attempted to keep pace with these changes. But it has been economically impossible to throw away the great investment that had been made in the earlier years of the road building era. And, since the most important roads were built first, and built according to the earlier standards, the result has been that the trunk lines are not only out of date and inadequate to carry their traffic loads, but are actually poorer roads than some of the lesser highways. They are often poorer in alignment, grade, width of pavement and right-of-way width, and condition of surface.

Thus we find that among the most important problems to be faced is the reconstruction of certain of our major arteries. Some of these roads are two lane roads and should be rebuilt with multiple lane design. This, of course, means four lane divided highways. The question of where to begin multiple lane roads is discussed below. Mr. Cox stated, however, that in Connecticut roads will be built according to traffic flow studies. One example of such studies may be repeated here:

U. S. 1 is an old, heavily traveled road and must be rebuilt. The question is whether to rebuild it in or very near its present location, or to relocate it some distance away. The Merritt Parkway parallels U. S. 1 a few miles to the north. On trips of some length cars could go to the Merritt Parkway using stub connections that might be built at certain intervals. If a sufficient number of cars did this U. S. 1 might not have to be rebuilt. But a study revealed that the average length of trip on U. S. 1 was only 8 miles. Therefore U. S. 1 must be rebuilt, and approximately in its present location. Mr. Cox stated that he depends entirely on his Highway Planning Survey for determining which roads are needed most. He added that the Connecticut Highway Planning Survey is very competent.

Of course not only present or pre-war traffic must be considered but possible future increases must be estimated in the light of known trends and expected economic developments. The state of Connecticut, on the basis of H. P. S. records and studies expects a 58% increase over its 1939 traffic. (Incidentally, it might be mentioned that today Connecticut traffic is only 22% of its pre-war traffic.)

Connecticut has been pretty much of a "pay as you go" state. Its income has not been sufficient to maintain a

system of roads adequate to meet its needs. Like most of the states, too, Connecticut is looking forward to the post-war period for a great highway construction program to be undertaken with both Federal and State Funds. A committee has been appointed to study the problem from the point of view of needs, fiscal ability, and necessary legislation, and to sell the program to the state legislature. This committee includes a retired jurist, an economist, a construction man, and a transportation expert. On it both urban and rural sections of the state are represented. It is expected that $250,000,000 will be spent in the next 15 years. With this in view a long range program for this period will be studied by the committee. A plan for a more immediate three year program will also be studied by this committee, which will make a determination of rate of expenditures and recommend to the legislature the statutes necessary.

Divided Lane Roads

No definite answer can be given to the question of where to begin multiple lane roads. Several factors affect it. The most important are traffic volumes and expected increases. Other factors are speed and character of traffic, size of vehicles (width is now limited to 8 ft.), and last but not least the economic factor.

Commissioner Cox of Connecticut stated that in his opinion, all roads carrying in excess of 4,000 vehicles per day should be multiple lane. He added, however, that due to the cost involved and the limited funds available, Connecticut's plan calls for four lane construction on roads that carry an average of 6,000 vehicles or more per day. Other states think they can afford dual lane roads with less traffic. For example, the program of one southwestern state sets 2,000 vehicles a day as the four lane criterion.

By-Pass Roads

Shall a road be located through or around a community? This broad and controversial matter can be only very briefly touched upon here. The purpose of an organization like a highway department is to provide transportation facilities that can make it possible for a motorist to travel from one place to another safely and expeditiously. With this in mind it would be hardly consistent to provide a fine highway on which traffic can make good time with a maximum of safety, and then to turn this traffic into a congested street full of intersections, parked vehicles and pedestrians. On the other hand, the business and social interest of the community are involved in the transportation facilities it has available. Furthermore, as has been indicated above, a very large proportion of the traffic on our highways is either local in nature or is destined for the community in question.

To properly fulfill its function a road must meet both of the above requirements, namely, to be safe and free from congestion, and to serve the city. The answer, in the case of towns of some size, seems to be: (1) for the road to go through the community close to the heart of the town with stub connections; and (2) provision of limited access for through traffic. The smaller towns could be by-passed at a short distance.

In discussing the question of selection of one of two or more possible routes, Commissioner Cox of Connecticut proposed a very interesting formula developed in his state as follows:

$$\frac{\text{ROAD USER BENEFITS}}{\text{COST}} = \text{INDEX}$$

The route having the higher index would obviously be the preferable one. Details of the application of this formula were not discussed but it was stated that the procedure will be described to the Highway Research Board at its meetings in November.

Submitted by George Papageorge of Georgia Highway Department.

Group Riding

by BURTON W. MARSH

GROUP RIDING—that is the regular practice of several persons riding together by swapping or sharing rides in a private automobile—offers very great opportunities for conserving tires, gasoline and now irreplaceable automobiles.

Long practiced by some persons, this conservation measure was not extensively used in pre-war days. This fact is clearly shown by numerous checks which indicated a car occupancy in cities of about 1.7 persons.

While very considerable increases in car occupancy figures are attainable when and where a real need exists and is realized, there are practical reasons why no such community-wide averages as 4 persons per car can be attained. Many persons do not live close to others having both common destinations and the same working or travel hours. Since group riding is based on voluntary acceptance, members of groups must be mutually acceptable and finding such persons is often not easy. This is partly due to natural difficulties of locating such persons even when there is a mutual willingness to form groups. Changes in working hours, carelessness about being ready on time for the group ride and other factors constitute practical obstacles and impose resistances.

Group riding requires changes of custom and adjustments by individuals to group arrangements. It must be borne in mind that most motorists had come to consider that one of the principal advantages of car ownership is that trips can be made when and as the individual desires.

Hence the readjustment of habits, customs and desires of individuals involved in group riding can only be expected to the extent that:

1. *Car owners realize that there is a very real need which applies to them individually,* and
2. *There are sufficiently strong inducements or incentives to cause car owners to participate.*
3. *Practical obstacles, such as possibility of involvement in accident damage claims, must be removed.*

The plain fact is that except in certain large plants and in certain other cases, these essentials have not been met and retained.

First advocated for conservation of tires, the public was given widely varying statements about how serious the need was for tire conservation. Frequently, statements were made which caused actual or potential group riders to decide that the need was no longer pressing or would soon cease to be serious. Gasoline rationing was used as the principal method of inducing persons to group ride. But many rationing boards were not strict in requiring group riding or its continuance as the basis for needed supplemental gasoline rations. Moreover, basic rationing policy mitigated against and still discourages group riding because of the penalty imposed by requiring use of part of the basic A ration for occupational group riding. Local voluntary ration boards quite generally lack both staff and basic data to administer this group riding-rationing function effectively.

It has not become at all widely realized that group riding is necessary to assure for an indefinite and perhaps long period, that there will be sufficient passenger cars in operation to do their major part in handling essential passenger transportation.

War transportation specialists are

convinced that much wider use of group riding is essential:

1. To assure that there will be no excessive wearing out of tires during the next six to nine-month critical period until adequate quantities of recaps, stockpile tires and new synthetic rubber tires will become available for civilian use.
2. To assure, especially in the Eastern shortage area, that limited gasoline supplies will be adequate for essential civilian passenger transportation.
3. To assure continuance in service of irreplaceable passenger cars during an extensive critical period which must be expected to extend considerably into the post-war period.

What Can Be Expected Of Group Riding?

If the above-stated requirements are fulfilled, we can expect much. It must be recognized, however, that there are limitations and local programs should take into account the following:

1. Group riding in general should supplement and not compete with satisfactory public transportation.
2. The greatest opportunity for success in group riding is where there are large concentrations of reasonably compatible groups residing reasonably close together, having common destinations or destination-areas of small size, desiring to make the two trips daily at the same hours, and where public transportation cannot satisfactorily provide the desired transportation.
3. The easiest success in group riding will be achieved among workers in plants or limited plant areas in outlying locations, especially where public transportation does not provide satisfactory service. The more distant the large plant or plant area is from the center of the community, the easier it is to attain and retain high car occupancies in group riding.
4. The more distant are concentrated worker residence locations from the work destination, the easier it is to attain and retain high group riding figures.
5. The more inconvenient, as through transferring and long travel time, is the public transportation service from concentrated worker residence locations to the work destination, the easier is the job of securing good group riding.
6. The higher is the cost of public transportation to and from the work destination, the easier it is to secure effective group riding.
7. It is inherently much more difficult to attain and maintain effective group riding among non-plant workers, especially among persons whose destinations are in or near the centers of communities. This is in part true because public transportation generally serves such areas much more adequately, partly because work hours and especially homeward-trip times are much less uniform, partly because more persons involved use their cars during the day for business purposes. Another difficulty is that it is far less easy to get suitable groups formed. In part the difficulty results from lack of proper organization and promotion with these groups—there are no comparable factors to interested plant managements and effective plant transportation committees.

Conclusions

1. Much more group riding must be achieved. Local efforts should be directed first to kinds and "areas" of group riding in which experience shows best results can be obtained.
2. As an essential basis, the public must be convinced of the vital necessity of their participation individually. Group riding must become "the thing to do". The appeal to patriotism can and should be used.
3. Effective inducements or incentives must be used. Proper rationing policies and their administration can provide the best inducement. This requires reversal of the present policy which penalizes group riding through A ration coupon losses. Financial incentive can be a considerable incentive with many drivers. Public opinion, if properly organized, can furnish a powerful incentive—even to the point where a person driving without justification WITHOUT RIDERS would feel that he was being regarded unfavorably by everyone.
4. Practical obstacles such as possibility of involvement in accident damage suit, must be removed from the minds of drivers. General understanding of the availability at very low cost of special group-riding insurance protection is one answer.
5. Federal agencies directly concerned should make a cooperative study of the proper scope and areas of effectiveness of group riding and of how satisfactory group riding can be instituted and maintained. Included should be analyses of difficulties and resistances. An effective program of coordinated action should result. Policies should be set forth or modified which will encourage group riding effectiveness.
6. A simple effective group riding manual should be developed which will present not only need, objectives and general discussion but also effective techniques and promotional methods.
7. Locally there must be effective leadership, organization and promotion. Local war transportation administrators and committees with full support of governmental leaders should be charged with these direct responsibilities. Plant transportation committees should continue to have these responsibilities in plants. There should be close cooperation with plant area boards and other rationing boards.
8. An effective and continuing program of public information and promotion of individual participation is vitally important. Cooperation of many private organizations will be forthcoming once this type of program has been set up.

An original paper by Burton W. Marsh, Director Traffic Engineering and Safety Department, American Automobile Association, Washington, D. C.

Measuring Optical Properties of Reflectorized Materials

by WILFRED W. DAVIS

UNITED STATES Army Engineers, working on the development of traffic control devices, found it advantageous to develop a method for evaluating the optical properties of reflectorized materials. These materials include paint and glass spheres for lane marking on highways and airports, and paint or lacquer films coated with glass spheres for traffic signs or other markers mounted in vertical position. In preparing a procurement specification for these materials it was found desirable to specify on the basis of optical properties. There appeared to be no reliable method available for describing the optical properties required for each type of material.

It is practically impossible to learn much about the optical properties of a reflectorized material by close visual inspection. Two materials that appear to be almost exactly alike may have very dis-similar optical properties. Even if two materials are illuminated by a beam of light and observed for optical characteristics, there may be no differences noted unless the observer understands the optical performance of these materials.

A beam of light falling upon a flat surface composed of small glass spheres is reflected back toward the source of light in the form of a solid cone of light. An observer located anywhere within the limits of the cone can see the reflected light appearing on the reflecting surface. If the reflected light cone is very small, in other words, if the observer must be in approximately the same position as the source of light to pick up the reflection, the reflectorized material is said to be highly retrodirective. Since the cone is small, the total amount of light returned is concentrated and is of high intensity. On the other hand, if the reflected light cone is large the reflected light can be picked up by an observer far removed from the source of light. The total reflected light is spread over a large area, and therefore is of low intensity. This type of material is said to possess wide angle characteristics and is called a wide angle type.

Reflectorized materials employed in traffic control work vary from the highly retrodirective types to the extremely wide angle types, and the selection of the material used is dependent upon traffic conditions and the functions of traffic control that the material is to perform. If it is desired to warn high speed traffic several hundred feet in advance of a hazard the material selected should be highly retrodirective because such material is known to provide good target value. The driver is directly behind the light source (the headlight) and is within the limits of influence of the small cone of high intensity reflected light returned by the sign. If information signs such as route markers or directional signs are to be reflectorized the material selected should provide good legibility at close range, thus a wide angle type is used. The reflectorized surface must have wide angle characteristics because when the vehicle is close up the driver is drawn away from a position directly behind the headlight, and in order for the reflected light to be seen by the driver the reflected cone of light must be large enough to enclose his line of sight.

With the advent of the blackout, traffic engineers were confronted with a new factor to increase the complex-

ity of their problems. The approved type blackout headlamp provides a very much smaller quantity of light than normal headlights. Thus many reflectorized materials entirely suitable under normal headlighting are found to be practically invisible when illuminated with the Army's blackout headlamp. Materials that were highly retrodirective could be picked up at a distance but would tend to fade out upon approaching the sign since the driver's line of view would move outside the limits of the small cone of reflected light. Wide angle types of reflectorized materials could not be seen at say 100 feet but could be seen at closer ranges. Thus it was concluded that the only adequate material for Army use under blackout conditions would have to be a compromise with the optical properties so that medium high brilliance would be obtained for the normal legibility ranges under 200 feet. In order to assure that the materials obtained possessed the desired characteristics it was necessary to develop a method for measuring them.

As a result of this need for evaluating the optical properties of reflectorized materials, the Engineer Board, Fort Belvoir, Virginia, The National Bureau of Standards, Washington, D. C., and manufacturers cooperated in the development of a relatively simple method for measuring these properties. This test method is described below.

The principal terms used in this test method are listed and defined as follows:

Entrance Angle. The angle between the normal to the reflectorized surface and the line of illumination is called the entrance angle. In actual road conditions, the entrance angle would be the angle between a line of perpendicular to the surface of the reflectorized material and the line of illumination from the headlamp to the material.

Divergence Angle. The angle measured between the line of illumination and line of view is called the divergence angle.

Apparent Reflectance. The unit in measuring the brilliance or reflection of a retrodirective reflective material is called apparent reflectance. A completely reflecting, perfectly diffusing surface will have unit apparent reflectance for any combination of entrance and divergence angles. A sample of white casein paint has been found to possess nearly ideal properties for a standard and will vary between 0.95 to 1.05. A sample reflectorized material, having an apparent reflectance of 20 for entrance angle of 0° and divergence angle of 0.5° would have to appear twenty times as bright as the completely reflecting, perfectly diffusing surface viewed under the same angular conditions.

Test Equipment

The test equipment consists of a goniophotometer in which the test surface may be illuminated at either 0°, 10°, 20°, 30°, 75° or 80° 20′ with a source having a horizontal angular spread not greater than 1.3° and a vertical angular spread not greater than 3°. With this apparatus the sample may be viewed in directions which diverge from the direction of illumination by 0.5°, 1° 20′ and 8.0°, respectively, with a receptor angular spread of not more than 1.6° in diameter. The light source in the apparatus is an incandescent electric lamp. A photoelectric cell similar in its spectral response to the standard luminosity function or a human observer working with a photometric device such as the Macbeth Illuminometer (sold by Leeds and Northrup Co., Philadelphia, Pa.), or the Luckiesh-Taylor brightness meter (sold by General Electric Co., Nela Park, Cleveland, Ohio) may be used

as the light receptor element. With any photoelectric receptor, care must be taken to see that it possesses only the small angular spread specified.

A suitable goniophotometer may be improvised with an ordinary spectrometer by mounting a half silvered mirror or pane of clear glass at the center point and mounting a sample holder with angular settings such that the light from the source passes through the glass, strikes the sample and the reflected cone of light returns to the glass (or half silvered mirror); a portion of the reflected light is in turn reflected into the receptor or photocell. The entrance angle setting is measured on a suitable scale on the sample holder and the divergence angle is varied by rotating the light receptor. The units should be kept as close together as possible to provide maximum passage of light to the photocell.

The working standard should be a surface calibrated for luminous apparent reflectance for some one of the combinations of entrance and divergence angles for which the apparatus may be readily set. (Working-standard surfaces calibrated for 45° entrance angle and normal or 0° divergence angle are available from the H. A. Gardner Laboratory, 1500 Rhode Island Avenue, N. W., Washington.

It has been found that a suitable standard surface may be readily prepared by coating a panel with white casein paint. This standard, while approximate, may be considered as having unit luminous apparent reflectance for all combinations of entrance and divergence angles used.

At least two settings for each combination of entrance and divergence angles for each sample should be made in order to compare the sample for apparent reflectance with the working standard.

Slight errors may occur in using the above method because of:

Failure to make the spectral response of the photocells closely similar to the ICI luminosity function.

Probable failure of the galvanometer deflection to be strictly proportional to cell current.

Minor polarization errors which may be introduced by the clear glass plate or half silvered mirror.

Slight color differences involved in the visual measurements using the Macbeth Illuminometer.

Minimum Requirements

The minimum requirements of optical properties for reflectorized materials that have been recommended for military traffic control are shown for various entrance and divergence angles in the tables below. The properties shown are suitable for materials to be used under normal or blackout illumination and under conditions of low or moderate vehicle speeds.

a. Highway signs and other vertical surfaces.

Entrance Angle	*Divergence Angle*	*Apparent Reflectance*
0°	30′	10.0
0°	8°	1.5
10°	30′	6.0
10°	8°	1.5
20°	30′	6.0
20°	8°	1.5
30°	30′	6.0
30°	8°	1.0

b. Highway surfaces (lane lines or pavement markings).

Entrance Angle	*Divergence Angle*	*Apparent Reflectance*
75°	1° 20′	3
88° 20′	1° 20′	10

c. Airport Runways (lane lines).

Entrance Angle	*Divergence Angle*	*Apparent Reflectance*
75°	1° 20′	6
88° 20′	1° 20′	10

A paper prepared by Wilfred W. Davis (Assoc. I.T.E.), Associate Engineer, Electrical Engineer Board, Fort Belvoir, Virginia, with the assistance of Mr. R. S. Hunter, Bureau of Standards, Washington, D. C.

This Blackout Will Help the Enemy

Slingshot sabotage can seriously impede the war effort in your city. Help prevent the hazards and waste caused by damage to street lights.

THE Government has recognized the wartime importance of traffic safety lighting by granting high priorities and by allotting sufficient materials to maintain every lighting system efficiently.

But efficient lighting and the prevention of waste can be obtained only with your cooperation. The man-power shortage and the limited material supply impose upon everyone the responsibility of alert conservation. We manufacturers are substituting less vital materials whenever feasible. The utilities are keeping their stocks down to the practical minimum. Everything possible must be done to preserve adequate lighting for the duration.

Here's What You Can Do to Stop Destruction of Lighting Equipment—A 5-Point Program

1. Conduct educational campaigns in the schools and through newspapers to combat thoughtless and malicious destruction.

2. Urge the public to report conditions which may cause service interruptions. These can then be corrected on regular service calls, saving the expense of emergency calls.

3. Request citizens to report damaged street lights promptly, in order to have service restored as quickly as possible. When any parts of the lighting equipment, such as canopies or sockets, are found on the ground, they should be picked up and returned to the utility.

4. Instruct the police department to give all possible protection to the lighting equipment.

5. Publicize any arrests or convictions for the breaking of street lights. Point out the grave results which may occur. Public safety demands the proper maintenance of street-lighting systems.

The engineering services of the General Electric Illuminating Laboratory are available to assist you with your traffic safety lighting problems. General Electric Company, Schenectady, N. Y.

GENERAL ELECTRIC

454-23D-3010

A. S. A. Approves Pre-Timed Controller Standards

The American Standards Association on October 14th gave formal approval to the standard for pre-timed fixed cycle traffic signal controllers developed by the Standards and Specifications Committee of the Institute of Traffic Engineers. This is concrete proof of the excellent job being done by this hard working committee. This standard was the second of a series prepared by the committee. The complete standard is included in appendix II of the Traffic Engineering Handbook.—*Editor.*

Using the Standard

NOW that printed copies of Technical Report No. 2, Pre-timed Fixed Cycle, Traffic Signal Controllers are readily available from I.T.E. headquarters at a nominal fee, it may be well to call attention to a very convenient usage of this specification. The customary procedure of the purchaser compiling 20 to 30 pages of specifications can now largely be eliminated. Instead the printed copies of Technical Report No. 2 may be referred to, stating which paragraphs are to apply to the purchase under consideration.

Thus, for example, if an interconnected traffic signal system is desired having three dial, triple offset flexibility, each bidder can be supplied with a copy of the printed specifications and the requirements stated concisely as follows:

"Traffic Signal Controllers are to be in accordance with Institute of Traffic Engineers Technical Report No. 2 for operation in a system as described under Plan No. 4.

Intersection Controllers are to be in accordance with:

Section 1

Paragraphs No. 1, No. 2, No. 3, No. 4, No. 5.1, No. 5.2, No. 5.3 (Green), No. 5.4 (Pedestal), No. 5.5, No. 5.6, No. 5.7, No. 6.1, No. 6.2, No. 6.3, No. 6.4, No. 7.1 (gears for 40, 45, 50, 55 and 60 seconds), No. 7.2, No. 8.1, No. 8.2 (minimum of 9 intervals), No. 8.303, No. 9.1, No. 9.2, No. 9.3, No. 9.4, No. 9.41 (with three timing dials for triple percentage and three interval timing setups), No. 10.1, No. 10.2 (9 pairs of contacts), No. 10.202 (plus one spare contact), No. 10.3, No. 11, No. 12.1, No. 12.2, No. 14.1.

Section 4

Paragraphs No. 1, No. 2, No. 3.11 (three offset relationships), No. 3.2, No. 3.3, No. 4.11, No. 5.11, No. 6.11, No. 7.11, No. 8.

Master Controllers are to be in accordance with:

Section 5

Paragraphs No. 1, No. 2, No. 3, No. 4.1, No. 4.11, No. 4.12, No. 4.13, No. 4.15, No. 4.16 (three dial interval setups), No, 4.2 (time switches for No. 4.15 and No. 4.16), No. 5, No. 6.1, No. 6.2."

By following the above procedure the purchaser can condense his requirements on one typewritten page thus saving himself much time and money and also being assured that the intent is clearly understood by all bidders participating. It is to everyone's advantage, therefore, if members will make such use of the specification.

MARTIN E. BRUENING, *Chairman, Standards & Specifications Committee*

KEEP YOUR SIGNS ON A 24 HOUR SCHEDULE

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REFLECTIVE SIGN SHEETING

24 Hour Visibility

You will find that "SCOTCHLITE" reflective sheeting is "made-to-order" for signs and markers that must have 24-hour visibility to meet the demands of today's around-the-clock traffic. "SCOTCHLITE" employs a reflective principle for use on all types of signs that assures clear night and day visibility.

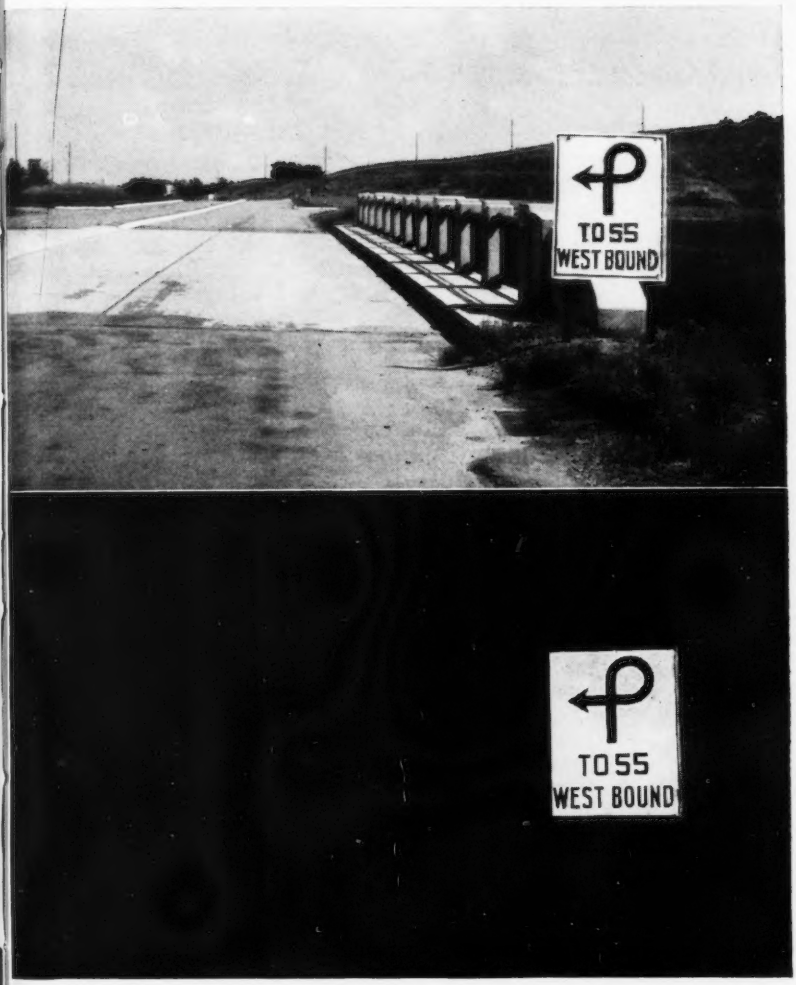
It is available in rolls ranging in widths from 1 inch to 24 inches, making it easy to fabricate an entire sign surface. Easily applied without special equipment or skill, it increases the amount of light reflected and gives signs identical night and day appearance without glare or distortion.

Why not join the group of satisfied users who are now reflectorizing with this economical method.

"SCOTCHLITE" is available in standard rolls 12 inches and 24 inches in width, 5, 10 and 50 yards in length. Standard colors are white, yellow and silver.

Write for a free copy of our new booklet which illustrates and describes in detail the uses and advantages of "SCOTCHLITE."

Made and Patented in U. S. A. by **MINNESOTA MI**



★ ★ ★ ★ ★
3-M PRODUCTS AIDING WAR PRODUCTION
ABRASIVE PAPER and CLOTH PRODUCTS
"SCOTCH" TAPES
ADHESIVES
WAX and SEALER
LAPPING and GRINDING COMPOUND
CUTTING and FINISHING COMPOUND
FIBRE PACKING
"SCOTCHLITE"

G & MANUFACTURING CO.
Saint Paul 6, Minnesota

Vehicular Speeds in Ohio

In order to determine the speed at which traffic is now moving over its roads, the Division of Traffic Safety of the Ohio Department of Highways has conducted observations in June, 1943 at 16 locations throughout the State. These locations were selected so that liberal percentages of truck movement could be had. Likewise, the locations were typically rural in character, thus giving a true picture of speed unaffected by metropolitan development.

Electric speed meters were used which removed the errors usually attributable to personnel and produced results that are believed to be as accurate as possible to obtain. Virtually one hundred per cent sampling was achieved due, probably, to reduced traffic volumes. At only two stations were there less than complete coverage and in those cases a total of but 99 cars were missed.

The observations were conducted throughout the month of May, 1943 and were confined to week days only. These were recorded at each station for 4 hours—9:00 to 11:00 a.m. and 1:00 to 3:00 p.m., and included vehicles traveling in either direction. No particular attention was paid to surface types or widths but in each case, recordings were conducted on straight level sections.

A total of 6,054 separate readings were recorded, each classed under the type of ration cards displayed on the vehicle. It was found that the total was made up as follows:

A—Book— 957—15.9%
B—Book—1170—19.3%
C—Book—1900—31.3%
T—Book—2027—33.4%
Total —6054

This is a logical distribution inasmuch as it would be expected that the holders of more C books and T Books would be on rural highways than would the holders of A and B Books.

Speeds range between a low of 17.0 miles per hour for a T Card to a high of 80 miles per hour for a C Card.

The average for each ration group with the results is as follows:

average speed

For A Card holders—37.3 m.p.h.
For B Card holders—38.6 m.p.h.
For C Card holders—40.1 m.p.h.
For T Card holders—36.2 m.p.h.
For all vehicles —38.1 m.p.h.

The average speed for vehicles displaying C Cards is probably not as fully informative as it might be due to the fact that such vehicles were not separated into light, heavy, buses, semi-trailer classifications. It also seems that the higher the allotment of fuel the higher is the average speed of travel.

In the case of each type of ration book the speeds are predominately above the recommended 35 mile per-hour limit. 60 per cent of all vehicles were traveling over 35 miles per hour and 28.5 per cent exceeded 40 miles per hour. The C holder appears to be the greatest violator. His violations are more frequent by about 10 per cent than either the A Card or the B Card holder.

Contributed by Harry E. Neal (Mem. I.T.E.), Chief Engineer, Division of Traffic and Safety, Department of Highways, Ohio.

Combatting War-Time Traffic Ills

by BERNARD C. HARTUNG

DESPITE rigid restrictions on speed, gas consumption and conservation of automobiles themselves, we are still experiencing a relatively high accident ratio in terms of car-miles driven. The war has deprived us of *over* 20% of our trained police personnel. A third factor is the rapid development of over populated centers, both military and civilian.

On top of this the police must contend with restricted communications plus a marked reduction in transportation units such as cars, motorcycles, etc.

This discussion of traffic conditions applies to Nevada, Utah and the other western states having similar problems. The 35 m.p.h. limit is quite trying, particularly over long stretches of desert highway. Also there is a certain amount of "rough road" driving which is not kind to re-treaded tires or grade 3 rubber. However, in the interest of national conservation, we must seek observance of all such regulations.

In a period of war, as in peace, there are three fundamental approaches to the control of a bad traffic situation, namely: Enforcement, Education and Engineering. In Nevada it is necessary for the state and local police to handle the first two of these assignments with the highway department and city engineering divisions responsible for the latter. In my opinion, it is correct for the police to "lead the way" in the educational program because of their influence with the public and also the fine effect that they have on the average group of school children. In an emergency, such as exists at the present time, this type of cooperation becomes doubly important. As an illustration, the police departments in Los Angeles have stepped up their instructional classes for civilians and military alike. This practice also prevails in the City of San Diego.

The reduction in motor vehicle accidents throughout the country has not kept pace with the restrictions imposed by the National Emergency. This is best illustrated by pointing to the fact that, since Pearl Harbor, 32,000 persons have been killed and over one million injured in auto mishaps. 16,000 of the fatalities were people directly engaged in war jobs. Every day, one hundred persons, more or less, become the victims of these accidents.

A war plant in Las Vegas—one of the largest on the Pacific Coast—carried the highest motor vehicle accident toll in history. A study of conditions revealed that most of the mishaps involved pedestrians. The corrective measures applied consisted of the installation of pedestrian lanes at strategic points and the use of additional patrolmen at heavily travelled intersections.

Attention should be given to those points which can stand *less* treatment. I refer to those signs, signals, and markings which are not doing a job under war conditions. For instance, an urban signal that no longer serves a maximum amount of traffic should be removed immediately, and a stop sign that borders an inactive boulevard should be hooded or taken away.

In the aforementioned over-populated areas, we should make a sincere effort to originate expedients such as

extra lanes, adequate grade separations, additional police regulations, and any other measures which will insure safe travel conditions. Las Vegas has recently completed a four-lane highway between this city itself and the Basic Magnesium Plant which has produced a marked decrease in traffic mishaps. This improvement was necessary in view of a 300% increase in motor vehicles traveling in that region. Recent figures submitted by the State of Utah indicate that traffic accidents have been reduced materially during the past year. Much credit is due the local newspapers for this excellent showing, due to the fact that they have consistently featured safety programs and other developments related to this problem.

In the last analysis the solution of the traffic accident problem and the promotion of safety on our highways can be attained only through teamwork and cooperation between the enforcement division, traffic engineers, and the public itself.

Extracts of a paper presented by Bernard C. Hartung (Assoc. I.T.E.), to the Utah Peace Officers' Association.

PLANT TRANSPORTATION OPERATION

Many benefits are derived from the active participation of labor on Plant Transportation Committees. Following are a few:

1. Labor members perform an important function in explaining regulations to fellow workers and in handling the complaints of those whose supplemental mileage has been "trimmed".

2. Labor members dispel any suspicion of favoritism. In carrying out the judicial task of the committee, all applicants for supplemental rations must be treated justly, and the appearance, as well as the reality of equity, must be preserved.

3. Labor members contribute knowledge of local housing and transportation conditions, driving or riding habits and personal characteristics.

4. Labor's assistance is effective in promotion of car-sharing. Shop stewards carry the campaign to each individual. Unions publicize this program in their meetings, radio programs, newspapers and journals and through other channels.

Most effective compliance with the requirements of car-sharing is that which is self-imposed by both management and labor. Necessary regulations can be most effectively enforced if they result from voluntary decisions of those whom they effect.

Management shows its interest by—

1. Providing a proper office, adequately staffed and equipped.

2. Providing sufficient finances and publicity materials for promotion of mileage conservation, tire maintenance and conservation.

3. Telling the workers how and why it is interested in the transportation plan—what is expected.

4. Requiring periodic reports on coupon issuance, mileage conserved, tire conditions and car occupancy.

5. Considering the transportation efforts of the committee a definite part of the war production drive.

6. Recognizing workers who fully cooperate by posting their names, awarding merit badges, or through other means of publicity.

7. Keeping shift changes at a minimum.

Digest of O.P.A. Bulletin, Vol. 1, No. 2.

ITE NEWS AND PERSONALS

Thanks and Congratulations

The Institute Committee for *Traffic Engineering* wishes to express its collective and individual thanks to the six retiring members of the past year who, under the most trying conditions, made possible the high standards of Volume XIII of *Traffic Engineering*. Our hope is each member gained considerably and grew professionally as a result of his participation and will continue to gain and grow with the expanding opportunities in the traffic field.

The *T. E.* staff for Vol. XIV will be dependent upon the membership and especially those who are and have been in close touch with Institute affairs and who are *doing things*.

Congratulations and thanks—
Lloyd M. Braff, Wilfred W. Davis, Richard J. Jackson, Tracy D. LeMay, Charles M. Upham, Jr., and William J. Weller.

Congratulation and welcome—new members—
Elroy L. Ericksen, Welton W. Harris, Stuart C. Hawley, R. E. Luckenbach, Norman D. Wilson.

Put To Vote

Consequent to action taken at the last annual ITE meeting the following three new resolutions are being submitted to the membership. If passed these will be new amendments to the Constitution and By-Laws.

Resolution 1—That Article I, Section 3, of the Constitution—Definition of Traffic Engineering—be deleted and the following substituted:

"Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon as their use is related to the safety, convenience and economy of transportation of persons and goods."

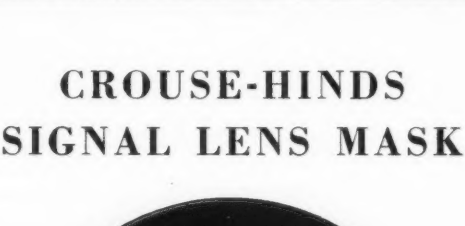
Resolution 2—That Article I, Section 3,of the By-Laws—Affiliate Membership—be deleted and the following substituted:

"An Affiliate at the time of admission, shall be a person who has contributed substantially to the advancement of the traffic engineering profession through outstanding achievement in a related field, in which he shall have been engaged for at least ten years, five years of which shall have been in responsible charge of important work. At no time shall an invitation to affiliate membership be extended if the number of Affiliate Members equals or exceeds 20% of the total number of Members and Associate Members."

Resolution 3—Article I, Section 2, of the Constitution be deleted and the following wording be substituted:

"The Institute shall maintain a headquarters office at such places as may be designated by the Board of Directors."

CROUSE-HINDS SIGNAL LENS MASK



OFFERS THESE ADVANTAGES:

1. Elimination of an accident hazard caused by paint peeling, chipping, or flaking from painted lenses.
2. Standard ITE shape—accurately cut.
3. Mounted between lens and door. Quickly installed—quickly removed.
4. A permanent arrow indication with no possibility of light leakage.

CROUSE-HINDS COMPANY

Syracuse 1, New York, U.S.A.

New York Section Formed

A New York Section of the Institute of Traffic Engineers was officially formed in New York City at a dinner meeting on Thursday, November 4th. There were 16 members in attendance. The group selected Hawley Simpson, Research Engineer of the American Transit Association, to act as chairman for all future get-togethers, and appointed Henry K. Evans, Traffic Engineer, National Conservation Bureau, as secretary of the Section. It was agreed to hold these meetings at approximate monthly intervals, and Thursday was selected as the best day of the week.

The next meeting will be held on Thursday evening, December 9th, at the Hotel Holley, 36 Washington Square West, New York City, at 7:00 P.M. Local members are urged to attend as well as any others of the Institute who may be in the vicinity at that time.

Chairman Simpson is planning the next meeting and when asked to comment, said, "It will probably be devoted mostly to discussion but will be for the most part a social meeting. The organization of the New York Section was in line with the thought developed at the recent ITE Work Conference at Yale University. The Board of Direction also has urged formation of sections to meet periodically. It is hoped that others will be formed in the interest of promoting cooperation and friendship within the Institute. The profession should emerge from the war with a bigger than ever job to do and a chance to attain the highest standing, and I believe these regional get-togethers will help to attain this objective."

Those in attendance at the first meeting were: Capt. Louis E. Bender, Graham Cole, Henry K. Evans, Fred W. Fisch, John T. Gibala, Bruce D. Greenshields, Harold F. Hammond, Stuart Hawley, Kenneth M. Hoover, Harry C. Koch, Merwyn A. Kraft, Theodore M. Matson, Virden Rittgers, Hawley Simpson, Wilbur Smith and Major Edward G. Wetzel.

Help! Help!

Institute members are urged to send material for this section to the News Editor, Henry K. Evans, Institute of Traffic Engineers, 60 John Street, New York 7, N. Y. Items relating to members' activities, new jobs available, surveys being carried on, meeting of local ITE sections, and miscellaneous bits of news will be appreciated.

What's on your mind? Is there some matter that you would like to bring before the attention of the Institute—some suggestion for improving the functioning of the organization? If so, President Hammond would like to hear from you. Next time you are dictating try to sandwich in a letter to Institute headquarters and give us some of your pet ideas.

HOW CAN THE I.T.E. BE OF MORE SERVICE TO THE MEMBERS?

Let's have your ideas on this. President Hammond wants your suggestions.

Where's Yours?

Members of the Institute are advised that if they have lost their membership certificate, they may secure a copy for a dollar. New members and those receiving raises in grade automatically receive new certificates. If you never received yours in the first place, kindly let the Secretary-Treasurer know and one will be sent to you immediately. This applies to all grades of membership.

Change of Address

Several members of the Institute have written in to the effect that materials and publications are not being sent to them because of change in their address. If you have a new mailing address, notify Institute headquarters at once.

Index in Next Issue

The December issue of TRAFFIC ENGINEERING will include an Index of the 12 issues in Volume XIII, ending with the September number.

Sales Jobs Open

A rapidly expanding division of an internationally known manufacturer wants a qualified engineer immediately for sales engineering work in the New England States, headquarters to be in Boston. Contacts and engineering work will be primarily in the field of traffic and highway engineering. An automobile will be furnished for traveling. Interested persons should send experience record and salary requirements to the Institute of Traffic Engineers Headquarters, 60 John Street, New York 7, N. Y.

News From Here and There

A total of twenty local transit and inter-city bus companies have filed application with the Civil Aeronautics Board for certificates to operate helicopter service, according to information just released by C.A.B.

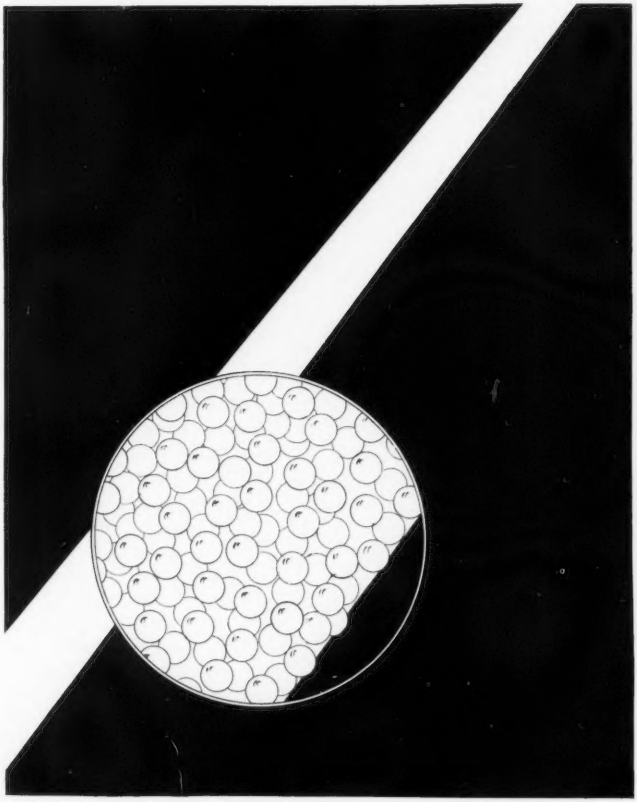
Joseph B. Eastman in a recent address before the American Trucking Association (October 20, Chicago) stated that although synthetic rubber is available there is a shortage of tire manufacturing capacity as well as shortages in supply of rayon and cotton tire cords and of manpower.

A decline in automobile registrations in 1943 to a little more than 25 million is indicated by registration data from 39 states for the first half of 1943, Public Roads Administration has announced. In 1941 registrations reached a peak of 29,507,113.

Mme. Perkins reveals that women made up 83.2% of the net addition of 1,833,000 to the factory working force in the United States from April, 1942, to June, 1943. There were 4,250,000 women in industry, or 30% of all factory workers, as of September, 1943.

Miss Elizabeth M. Herlihy, Chairman of the Massachusetts State Planning Board, at 11 Beacon Street, Boston, writes *that the staggered hours program organized in Boston about a year ago relieved the peak hour to such an extent that the Elevated was able to absorb the impact caused by the new change in Navy Yard hours, but with nothing to spare. The Navy Yard changed from three shifts to two shifts, which brought the morning and evening shifts right in the middle of peak conditions. It would not have been possible for the Elevated to meet conditions if the staggered hour program were not in effect.*

PRISMO "LIFELINE"



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Personals

ENSIGN CHARLES UPHAM, JR. (Jun.), Hartford Chamber of Commerce Traffic Engineer, on October 29th reported for active duty at the Naval Training School, Cornell University, Ithaca, New York, receiving a leave of absence from the Hartford Chamber of Commerce. In a letter, Charlie confided, "I am finally working for my uncle. I will guarantee one thing—home was never like this."

T. M. MATSON (Mem.), Director, Yale Bureau for Street Traffic Research, while passing through New York City recently divulged the following bit of information: "There seems to be continued evidence of the world-wide trend toward the right-hand rule for driving. Panama has just changed from the left-hand over to the right-hand rule, and this question of making the change is being renewed in England". Matson ventured the opinion that Argentina is the only country of the Americas that still adheres to the old left-hand rule.

GEORGE THOMPSON, a member of the first class at the Bureau for Street Traffic Research, died at his home in Medford, Mass., on October 21st. Mr. Thompson was a Lieutenant Inspector in the Uniform Division of the Massachusetts State Police at the time of his death and was highly respected by all those that came in contact with him. He was one of several police officers in the first formal group of students of the Bureau at Harvard University.

RUSSELL HARRISON (Assoc. I.T.E.) recently accepted the position as Traffic Engineer with the National Safety Council, 20 North Wacker Drive, Chicago, 6, Ill. Mr. Harrison was formerly City Traffic Engineer, Kalamazoo, Michigan.

LIEUT. WORTHAM DIBBLE (Assoc.), on leave from the South Carolina Highway Department, was recently cited for bravery under fire in New Guinea.

LIEUT. STEPHEN BUTTERFIELD (Assoc.), on leave from the Connecticut State Highway Department, received a transfer to the Army Transportation Corps and is now stationed in New Orleans, Louisiana, with the Sixth Traffic Regulation Group.

MAJOR GEORGE W. BARTON (Mem.). on leave from the Chicago Motor Club, is still in Africa in transportation work, having played an important part in the invasion of Sicily and Italy. He spent three weeks recently, convalescing as a result of an African skin disease.

CAPT. HARRY H. HARRISON (Mem.), on leave from the Illinois Division of Highways, reports that he is in Sicily working with Major F. M. Kreml (Affil.), on leave as Director of Traffic Safety, International Association of Chiefs of Police.

RUFUS G. JASPER (Assoc.), formerly Fleet Safety Engineer for the National Safety Council, recently resigned to accept a position as Senior Safety Engineer, Shore Establishment Division, United States Navy, Washington, D. C. Mr. Jasper began work with the Council in 1938.

FRED W. FISCH (Assoc.), Director of the Schenectady Bureau of Traffic and City Planning, and now serving his second term as president of the New York State Federation of Official Planning Boards, points out in a recent article that a community without an active planning board or experienced planning guidance is a community

without vision these days. He said that each community should take an inventory, consider the desires and needs of its people, determine the method of approach and then provide a sufficient budget, this last being of major importance.

HENRY W. OSBORNE (Mem.), Buffalo City Traffic Engineer, has completed a comprehensive report on post-war traffic plans, including estimates of costs for field surveys and planned development dealing with traffic control intersection design, highway planning, off-street parking facilities, and allied subjects.

CAPT. LOUIS E. BENDER (Assoc.), United States Army Transportation Corps, on leave from the Indiana State Highway Commission, and stationed at Atlanta, Georgia, is spending a month at Fort Slocum, New York, taking up some special training.

JOSEPH E. HAVENNER (Jun.), Ensign, U.S.N.R., was recently returned from the South Pacific to the hospital at Mare Island because of illness. He obtained a leave of absence, and spent some time in Los Angeles with his family before reporting back on October 30.

Looking Ahead

BOARD OF DIRECTION of the Institute of Traffic Engineers will hold a meeting at the Edgewater Beach Hotel, in Chicago, on Tuesday, November 30, at 2:00 P.M.

HIGHWAY RESEARCH BOARD will hold its annual meeting from November 27th to 30th, at the Edgewater Beach Hotel, in Chicago, Illinois. Subjects to be discussed in the sessions of interest to traffic engineers will include, "Current Trends in Highway Traffic—Origins and Destinations of Highway Traffic, as Applied to Planning in Connecticut—Influence of Alignment on Operating Characteristics—Predicting Traffic Death Rates —Relation of Cross Section Design to Transverse Placement." The Department of Traffic and Operations will hold its sessions on Saturday, Sunday and Monday afternoons beginning November 27th.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS' 29th annual meeting will take place in Chicago on December 1-3, 1943. This will be held at the Edgewater Beach Hotel, and will deal with problems confronting state highway departments now and during the post-war period. Registration and pre-enrollment of delegates will be in charge of Mr. C. H. Apple, District Engineer, State Highway Department, 205 West Monroe Street, Chicago, Illinois.

Labor Unions And Engineers

Most scientists and engineers have shunned C.I.O.'s union, The Federation of Architects, Engineers, Chemists and Technicians as well as A. F. of L.'s International Federation of Technical Engineers, Architects and Draftsmen.

Recently the American Society of Civil Engineers meeting in Atlanta laid the foundation for its own union by voting to recommend that its local branches set up collective-bargaining committees to negotiate salaries for their members, 90 per cent of whom are eligible to join other unions. The A.S.C.E. will hire four experienced representatives as consultants on organizing and bargaining. The local collective-bargaining committees will be independent of the national society.

ON THE SHELF

Proceedings, Highway Research Board, Volume 21, approximately 600 pages.

OEM Handbook, Office for Emergency Management. Describes in detail the organization of the War Production Board, the Office of Price Administration and other constituent agencies of the OEM. Copies available in room 1501, New Social Security Building, Washington, D. C.

College-Level Safety Training: by J. I. Yellott, reprint form, National Safety News, Sept. 1942: Explains methods used by engineering colleges to counteract the growing shortage of technically trained safety engineers.

Minnesota Safety Program—a plan for coordination of Minnesota safety activities through cooperation of departments of state, by A. V. Rohweder, President, Minnesota Safety Council, St. Paul, Minn.

STATEMENT OF OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, and MARCH, 3, 1933.

OF Traffic Engineering, published monthly AT Plainfield, New Jersey, for October 1, 3, 1933.

State of Rhode Island }
County of Providence } ss.

Before me a Notary Public in and for the State and County aforesaid, personally appeared Leslie Williams, who, having been duly sworn according to law, deposes and says that he is the editor of Traffic Engineering and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, (and if a daily paper the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and address of the publisher, editor, managing editor, and business managers are:

Publisher—Institute of Traffic Engineers, 400 Watchung Avenue, Plainfield, New Jersey; Editorial Office, 60 John Street, New York, New York.

Editor—Leslie Williams, 14 College Street, Providence, Rhode Island.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and address of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation the names and address of the individual owners must be given. If owned by a firm, company or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Institute of Traffic Engineers, 60 John Street, New York, New York.

Harold F. Hammond, President, 60 John Street, New York, New York.

Thomas J. Seburn, Vice-President, City Hall, Kansas City, Missouri.

Wilbur S. Smith, Secretary-Treasurer, Yale University, New Haven, Connecticut.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders, as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustees or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than that of a bone fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is
(This information is required from daily publications only.)

LESLIE WILLIAMS, Editor.

Sworn to and subscribed before me this 16th day of November, 1943.

FRANCES L. HEWSON, Notary Public.